READY WHEN YOU ARE

ISO TURNING

All-Star Focused Edition

ALL-STAR

AHB TOOLING & MACHINERY

COMPLETE METALWORKING SOLUTIONS

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customerservice@ahbinc.com

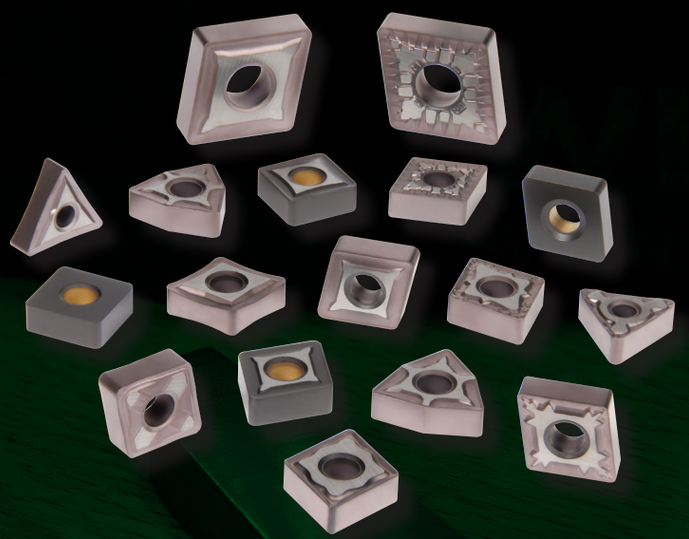
WIDIA™

ISO TURNING INSERTS

ARE READY WHEN YOU ARE!

These inserts have a great cost-performance ratio and are ready to ship to you when you need them the most.

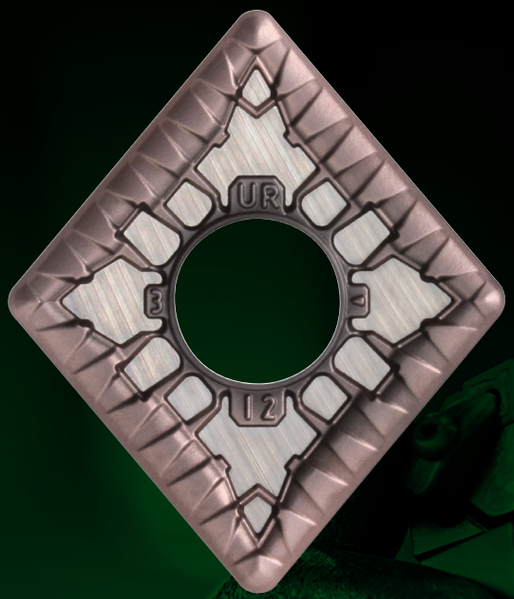
WIDIA™ Victory™ ISO Turning inserts have been engineered to operate under an array of cutting conditions from finishing to roughing.



WIDIA™
SHINING
MOMENT

A-13-03128

Application Description: Facing and surfacing	Competitor	WIDIA
	—	WP15CT
Workpiece Diameter	75 mm / 2.95 in	75 mm / 2.95 in
Machining Speed	230 m/min / 754 sfm	230 m/min / 754 sfm
Machining Feed	0.28 mm/rev / 0.01 in/rev	0.32 mm/rev / 0.012 in/rev
Cutting Depth	2.8mm / 0.11 in	2.8 mm / 0.11 in
Customer Goal	—	Increase no. of pieces per edge



Learn More About WIDIA™

Contact a WIDIA™ expert or local distributor for more information on the All-Star program. Review additional All-Star products using our digital solutions.

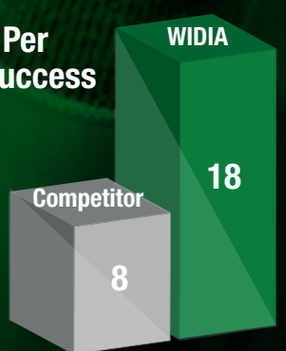
Visit widia.com.

The All-Star product line consists of specially selected products that are highly requested and always available to fill the demand.

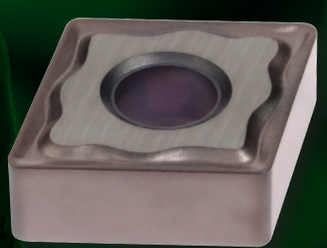
At the heart of this strategically assembled group is a specific selection of the ISO Turning portfolio. This group contains a number of inserts for rough to finish turning of steel, cast iron, stainless steel, and high temp alloys.

All-Star products are always available, so testing a Victory™ turning insert is as easy as calling your local WIDIA distributor.

Pieces Per Edge Success



225%
Increase of pieces per edge!



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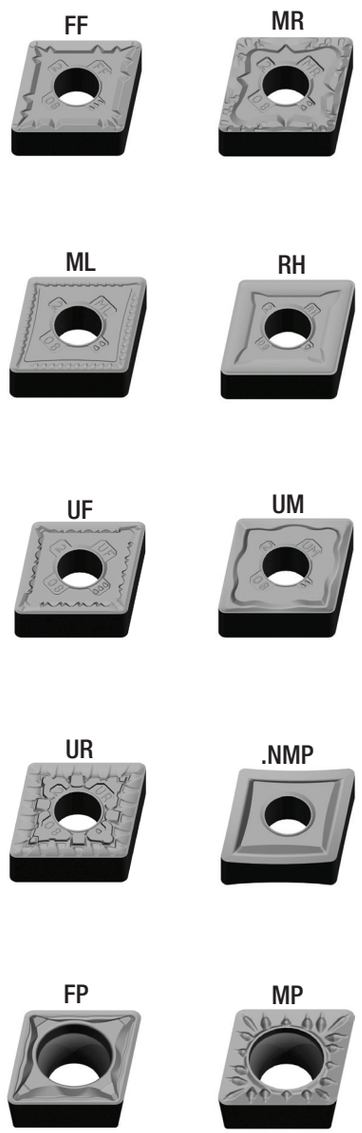
Victory Geometries



Victory Toughness/Wear Resistance

WP Grades for Steel

- Four grades and seven primary geometries for use in roughing to finishing operations. Increase cutting speed and/or feed rate to gain productivity.

WM Grades for Stainless Steel

- Three grades across 12 geometries for use in roughing to finishing operations.
- Increase cutting speed and /or feed rate by up to 30% over similar competitive grades.

WK Grades for Cast Iron

- Three grades to cover all of our cast iron turning operations.
- Very good balance of wear resistance and toughness for long predictable tool life. Flat top geometry for machining cast iron. For finishing to roughing applications.

WS Grades for High-Temp Alloys

- Two grades for use in roughing to finishing operations.
- Very good wear resistance for longer tool life.
- One uncoated grade for use in titanium.

Rough (Steel)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	ISO	WP15CT	WP25CT	WP35CT
CNMG432RH	CNMG120408RH	4170979	4171504	5684356
CNMG433RH	CNMG120412RH	4170980	4171505	4171698
CNMG434RH	CNMG120416RH	4170981	4171506	4171699
CNMG542RH	CNMG160608RH	4170982	4171507	4171700
CNMG543RH	CNMG160612RH	4170983	4171508	4171701
CNMG544RH	CNMG160616RH	4170984	4171509	4171702
CNMG642RH	CNMG190608RH	4170985	4171510	4171703
CNMG643RH	CNMG190612RH	4170986	4171511	4171704
CNMG644RH	CNMG190616RH	4170987	4171512	4171705
CNMG646RH	CNMG190624RH	—	4171523	—
DNMG432RH	DNMG150408RH	—	4171524	4171707
DNMG442RH	DNMG150608RH	4170991	4171526	4171709
DNMG443RH	DNMG150612RH	4170992	4171527	4171710
RNMG43RH	RNMG120400RH	4170996	4171531	4171713
RNMG64RH	RNMG190600RH	—	4171532	4171714
SNMG432RH	SNMG120408RH	4170998	4171533	4171715
SNMG433RH	SNMG120412RH	4170999	4171534	4171716
SNMG434RH	SNMG120416RH	4171000	4171535	—
SNMG542RH	SNMG150608RH	4171001	4171536	—
SNMG543RH	SNMG150612RH	4171002	4171537	4171719
SNMG544RH	SNMG150616RH	4171003	4171538	4171720
SNMG643RH	SNMG190612RH	4171005	4171540	4171722
TNMG332RH	TNMG160408RH	4171007	4171542	4171724
TNMG333RH	TNMG160412RH	—	4171543	4171725
TNMG432RH	TNMG220408RH	4171009	4171544	4171726
TNMG433RH	TNMG220412RH	4171010	4171545	4171727
VNMG332RH	VNMG160408RH	—	4171550	4171732
VNMG432RH	VNMG220408RH	—	4171551	4171733
VNMG433RH	VNMG220412RH	4171017	4171552	4171734
WNMG432RH	WNMG080408RH	4171019	4171554	4171736
WNMG433RH	WNMG080412RH	4171020	4171555	4171737
WNMG434RH	WNMG080416RH	—	4171556	—

Medium Roughing (Steel)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

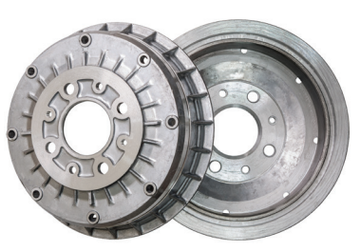
ANSI	ISO	WP15CT	WP25CT	WP35CT
CNMG431MR	CNMG120404MR	4171130	4170546	4170043
CNMG432MR	CNMG120408MR	4171131	4170547	4170044
CNMG433MR	CNMG120412MR	4171132	4170548	4170045
CNMG542MR	CNMG160608MR	4171134	4170549	—
CNMG543MR	CNMG160612MR	—	4170550	4170046
CNMG544MR	CNMG160616MR	4171136	4170551	—
CNMG643MR	CNMG190612MR	4171137	4170552	—
CNMG644MR	CNMG190616MR	4171138	4170563	—
DNMG431MR	DNMG150404MR	4171140	4170565	—
DNMG432MR	DNMG150408MR	4171141	4170566	4170052
DNMG441MR	DNMG150604MR	4171143	4170568	4170054
DNMG442MR	DNMG150608MR	4171144	4170569	4170055
DNMG443MR	DNMG150612MR	4171145	4170570	—
SNMG432MR	SNMG120408MR	4171146	4170571	4170057
SNMG433MR	SNMG120412MR	—	5684355	—
SNMG543MR	SNMG150612MR	4171147	—	—
SNMG643MR	SNMG190612MR	4171148	4170572	—
TNMG331MR	TNMG160404MR	4171150	4170573	4170059
TNMG332MR	TNMG160408MR	4171151	4170574	4170060
TNMG333MR	TNMG160412MR	4171152	4170575	—
TNMG432MR	TNMG220408MR	4171154	4170577	4170063
VNMG332MR	VNMG160408MR	4171157	4170580	4170066
WNMG432MR	WNMG080408MR	4171158	4170581	4170067
WNMG433MR	WNMG080412MR	4171159	4170582	4170068

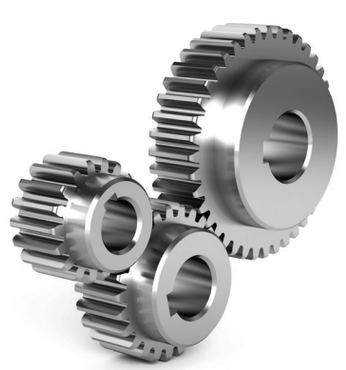
Finishing Positive (Steel)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	**ISO**	**WP15CT**	**WP25CT**
CCMT21505FP	**CCMT060202FP**	4169857	4170140
CCMT2151FP	**CCMT060204FP**	4169858	4170141
CCMT2152FP	**CCMT060208FP**	—	4170142
CCMT32505FP	**CCMT09T302FP**	—	4170293
CCMT3251FP	**CCMT09T304FP**	4169860	4170294
CCMT3252FP	**CCMT09T308FP**	4169861	4170295
CCMT431FP	**CCMT120404FP**	—	4170296
CCMT432FP	**CCMT120408FP**	4169993	4170297
CPMT2151FP	**CPMT060204FP**	4170016	4170326
CPMT3252FP	**CPMT09T308FP**	4170019	4170329
DCMT21505FP	**DCMT070202FP**	—	4170299
DCMT2151FP	**DCMT070204FP**	4169995	4170300
DCMT32505FP	**DCMT11T302FP**	4169996	4170302
DCMT3251FP	**DCMT11T304FP**	4169997	4170303
DCMT3252FP	**DCMT11T308FP**	4169998	4170304
DCMT431FP	**DCMT150404FP**	4170000	4170306
DCMT432FP	**DCMT150408FP**	4170001	4170307
SCMT3252FP	**SCMT09T308FP**	—	4170309
SCMT432FP	**SCMT120408FP**	—	4170311
TCMT2151FP	**TCMT110204FP**	4170006	4170313
TCMT3251FP	**TCMT16T304FP**	4170008	4170315
TCMT3252FP	**TCMT16T308FP**	—	4170316
TCMT432FP	**TCMT220408FP**	—	4170317
VBMT221FP	**VBMT110304FP**	4170012	4170319
VBMT3305FP	**VBMT160402FP**	—	4170321
VBMT331FP	**VBMT160404FP**	4170013	4170322
VBMT332FP	**VBMT160408FP**	4170014	4170323





Finishing (Steel)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	ISO	WP15CT
CNMG431FF	CNMG120404FF	4171025
CNMG432FF	CNMG120408FF	4171026
CNMG433FF	CNMG120412FF	4171027
DNMG431FF	DNMG150404FF	4171030
DNMG441FF	DNMG150604FF	4171032
DNMG442FF	DNMG150608FF	4171043
DNMG443FF	DNMG150612FF	4171044
TNMG331FF	TNMG160404FF	4171050
TNMG332FF	TNMG160408FF	4171051
TNMG333FF	TNMG160412FF	4171052
WNMG331FF	WNMG060404FF	4171055
WNMG332FF	WNMG060408FF	4171056
WNMG431FF	WNMG080404FF	4171057
WNMG432FF	WNMG080408FF	4171058

Medium Machining (Stainless Steel)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

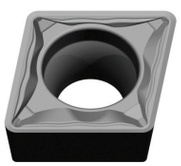
ANSI	ISO	WS10PT	WM15CT	WM25CT	WM35CT
CNMG431UM	CNMG120404UM	5645217		4172380	4172410
CNMG432UM	CNMG120408UM	—	4172335	4172381	4172411
CNMG433UM	CNMG120412UM	—	—	4172382	—
DNMG331UM	DNMG110404UM	—	—	4172383	4172413
DNMG332UM	DNMG110408UM	—	4172338	4172384	4172414
DNMG432UM	DNMG150408UM	—	4172341	4172387	—
DNMG441UM	DNMG150604UM	—	—	4172389	—
DNMG442UM	DNMG150608UM	—	4172364	4172390	4172420
SNMG431UM	SNMG120404UM	—	—	4172393	—
SNMG432UM	SNMG120408UM	—	4172367	4172394	4172424
SNMG433UM	SNMG120412UM	—	—	4172395	4172425
TNMG331UM	TNMG160404UM	5550226	4172369	4172396	—
TNMG332UM	TNMG160408UM	5550228	4172370	4172397	4172427
WNMG331UM	WNMG060404UM	—	4172375	4172403	4172432
WNMG431UM	WNMG080404UM	—	4172377	4172406	4172435
WNMG432UM	WNMG080408UM	—	4172378	4172407	4172436
WNMG433UM	WNMG080412UM	5645269	—	4172408	—

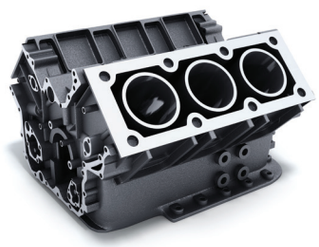
Roughing (Stainless Steel)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	**ISO**	**WM15CT**	**WM25CT**	**WM35CT**
CNMG431UR	**CNMG120404UR**	4169406	4169444	4169479
CNMG432UR	**CNMG120408UR**	4169407	4169445	4169480
CNMG433UR	**CNMG120412UR**	4169408	4169446	4169481
CNMG434UR	**CNMG120416UR**	—	4169447	4169482
CNMG542UR	**CNMG160608UR**	4169410	4169448	4169483
CNMG543UR	**CNMG160612UR**	4169411	4169449	4169484
CNMG544UR	**CNMG160616UR**	—	4169450	4169485
CNMG643UR	**CNMG190612UR**	4169412	4169451	4169486
CNMG644UR	**CNMG190616UR**	4169423	4169452	4169487
DNMG332UR	**DNMG110408UR**	4169424	4169453	4169488
DNMG432UR	**DNMG150408UR**	—	4169454	—
DNMG442UR	**DNMG150608UR**	4169427	4169456	4169492
DNMG444UR	**DNMG150616UR**	—	—	4169494
SNMG432UR	**SNMG120408UR**	4169429	4169458	4169495
SNMG433UR	**SNMG120412UR**	4169430	4169459	4169496
SNMG434UR	**SNMG120416UR**	—	4169460	4169497
SNMG543UR	**SNMG150612UR**	—	4169461	4169498
SNMG643UR	**SNMG190612UR**	4169433	4169463	4169500
SNMG644UR	**SNMG190616UR**	—	4169464	4169501
TNMG332UR	**TNMG160408UR**	4169434	4169465	—
TNMG333UR	**TNMG160412UR**	—	4169466	—
VNMG332UR	**VNMG160408UR**	4169439	4169473	4169508
VNMG333UR	**VNMG160412UR**	—	4169474	—
WNMG332UR	**WNMG060408UR**	4169441	4169475	—
WNMG432UR	**WNMG080408UR**	4169442	4169476	4169509
WNMG433UR	**WNMG080412UR**	—	4169477	4169510





Finishing Positive (Stainless Steel)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	ISO	WM15CT	WM25CT
CCMT21505FP	CCMT060202FP	—	4168778
CCMT2151FP	CCMT060204FP	4168738	4168779
CCMT2152FP	CCMT060208FP	—	4168780
CCMT32505FP	CCMT09T302FP	—	4168781
CCMT3251FP	CCMT09T304FP	—	4168782
CCMT3252FP	CCMT09T308FP	4168741	4168783
CCMT431FP	CCMT120404FP	—	4168784
DCMT21505FP	DCMT070202FP	—	4168787
DCMT2151FP	DCMT070204FP	—	4168788
DCMT32505FP	DCMT11T302FP	—	4168790
DCMT3251FP	DCMT11T304FP	4168765	4168791
DCMT3252FP	DCMT11T308FP	—	4168792
TCMT21505FP	TCMT110202FP	—	4168800
TCMT2151FP	TCMT110204FP	—	4168801
VBMT221FP	VBMT110304FP	—	4168807
VBMT3305FP	VBMT160402FP	—	4168809
VBMT331FP	VBMT160404FP	4168776	4168810
VBMT332FP	VBMT160408FP	—	4168811

Finishing (Stainless Steel)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	ISO	WS10PT	WM15CT	WM25CT
CNMG431UF	CNMG120404UF	5645600	4169353	4169379
CNMG432UF	CNMG120408UF	5645588	4169354	4169380
DNMG331UF	DNMG110404UF	5645603	4169356	4169382
DNMG431UF	DNMG150404UF	—	4169358	4169384
DNMG441UF	DNMG150604UF	—	4169361	4169387
DNMG442UF	DNMG150608UF	—	4169362	4169388
SNMG431UF	SNMG120404UF	5645610	4169364	4169390
TNMG331UF	TNMG160404UF	5432605	4169367	4169393
VNMG331UF	VNMG160404UF	5645616	4169372	4169398
WNMG431UF	WNMG080404UF	5645619	4169376	4169402
WNMG432UF	WNMG080408UF	5645623	4169377	4169403
WNMG433UF	WNMG080412UF	—	4169378	4169404

Roughing (Cast Iron)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	ISO	WK20CT
CNMG432RH	CNMG120408RH	4171903
CNMG433RH	CNMG120412RH	4171904
CNMG434RH	CNMG120416RH	4171905
CNMG542RH	CNMG160608RH	4171906
CNMG543RH	CNMG160612RH	4171907
CNMG544RH	CNMG160616RH	4171908
CNMG643RH	CNMG190612RH	4171910
CNMG644RH	CNMG190616RH	4171911
DNMG442RH	DNMG150608RH	4171914
DNMG443RH	DNMG150612RH	4171915
DNMG444RH	DNMG150616RH	4171916
SNMG432RH	SNMG120408RH	4171918
SNMG433RH	SNMG120412RH	4171919
SNMG542RH	SNMG150608RH	4171921
SNMG543RH	SNMG150612RH	4171922
SNMG544RH	SNMG150616RH	4171923
SNMG643RH	SNMG190612RH	4171925
SNMG644RH	SNMG190616RH	4171926
TNMG332RH	TNMG160408RH	4171927
WNMG432RH	WNMG080408RH	4171932
WNMG433RH	WNMG080412RH	4171933

Holders and Clamp Styles

D-Style Clamping
- Used for negative style inserts.
- Clamp assembly contains clamp, screw, and retaining ring.
- Quick insert indexing.
- Ensures insert repeatability and seating.
- Reduced chatter and extended tool life.

P-Style Clamping
- Lever-type clamping system for negative indexable inserts.
- No interference to chip flow.
- Fast insert changes.

P-Style available in metric sizes only.

S-Style Clamping
- Screw clamping system for positive indexable inserts.
- Compact design for high reliability and cost efficiency.
- Carbide shim for additional tool protection.

To view our holder offerings visit NOVO or widia.com.

Roughing (Cast Iron)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	ISO	WK05CT	WK20CT
CNMA432	CNMA120408	4171596	4171864
CNMA433	CNMA120412	4171597	4171865
CNMA434	CNMA120416	4171598	4171866
CNMA543	CNMA160612	4171599	4171868
CNMA544	CNMA160616	—	4171869
CNMA643	CNMA190612	4171602	4171871
CNMA644	CNMA190616	—	4171872
DNMA332	DNMA110408	—	4171873
DNMA442	DNMA150608	4171637	4171878
DNMA443	DNMA150612	4171638	4171879
DNMA444	DNMA150616	—	4171880
RNMA43	RNMA120400	4171639	4171881
SNMA432	SNMA120408	4171640	4171882
SNMA433	SNMA120412	4171641	4171883
SNMA542	SNMA150608	—	4171885
SNMA644	SNMA190616	4171646	4171889
TNMA332	TNMA160408	4171647	4171890
TNMA333	TNMA160412	—	4171891
TNMA433	TNMA220412	4172230	4171894
TNMA434	TNMA220416	—	4171895
VNMA332	VNMA160408	4171652	4171897
WNMA432	WNMA080408	4171654	4171900
WNMA433	WNMA080412	4171655	4171901

Medium Machining (Cast Iron)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

ANSI	ISO	WK20CT
CCMT2151MP	CCMT060204MP	4170237
CCMT3252MP	CCMT09T308MP	4170239
CCMT432MP	CCMT120408MP	4170240
CCMT433MP	CCMT120412MP	4170241
DCMT3251MP	DCMT11T304MP	4170242
DCMT3252MP	DCMT11T308MP	4170243
SCMT3252MP	SCMT09T308MP	4170245
SCMT432MP	SCMT120408MP	4170247
TCMT3252MP	TCMT16T308MP	4170251
TCMT3253MP	TCMT16T312MP	4170252
VBMT332MP	VBMT160408MP	4170254

Finishing to Medium Machining (Cast Iron)

P M K N S H

Smooth Cut, Pre-Turned Surface	Lightly Interrupted Cut	Heavily Interrupted Cut

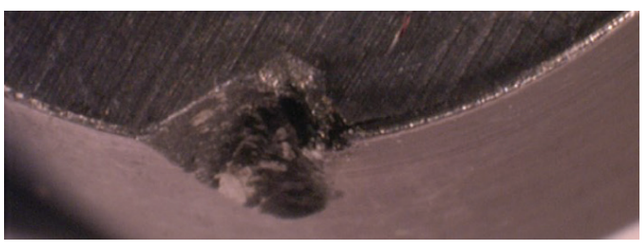
ANSI	ISO	WK05CT	WK20CT
CNMG431ML	CNMG120404ML	—	4171390
CNMG432ML	CNMG120408ML	4171658	4171391
CNMG433ML	CNMG120412ML	—	4171392
DNMG331ML	DNMG110404ML	4171660	4171394
DNMG442ML	DNMG150608ML	—	4171400
SNMG431ML	SNMG120404ML	—	4171403
SNMG432ML	SNMG120408ML	—	4171404
TNMG332ML	TNMG160408ML	4171672	4171410
VNMG332ML	VNMG160408ML	—	4171414
WNMG431ML	WNMG080404ML	4171678	4171417
WNMG432ML	WNMG080408ML	4171679	4171418

Troubleshooting should be performed in a sequential method to identify and solve your machining problems. These problems can be recognized as premature insert edge failure, part appearance, machine noise or vibration, and tool appearance. Successful troubleshooting requires correctly identifying the problem, then taking the necessary corrective action one step at a time. The four key areas of concern are: 1) Cutting tool material (Grade), 2) Machine, 3) Workpiece and 4) Set-up.

This section discusses possible causes and recommends corrective actions for each of the four areas. If more than one step is taken concurrently, the real cause of the problem may never be discovered. Always perform one corrective measure at a time.

Depth-of-Cut Notching

Appears when chipping or localized wear at the depth-of-cut line on the rake face and flank of the insert occurs. Notching is primarily caused by the condition of the workpiece material. Material conditions prone to depth-of-cut notch include an abrasive workpiece skin of scale, abrasive properties of high-temperatures alloys like INCONEL®, a work-hardened outer layer resulting from a previous machining operation, or heat-treated material above 55 HRC.



CAUSE	SOLUTION
Grade	Use a more wear-resistant grade of carbide.
Edge Prep	Use honed or T-land inserts.
Speed	Reduce speed.
Programming	Vary depth of cut on very abrasive materials.
Feed	Reduce feed.

Built-Up Edge

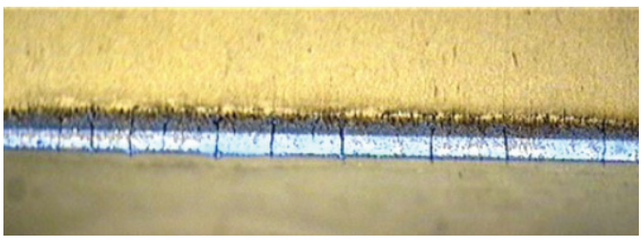
This condition involves the adhesion of layers of workpiece material to the top surface of the insert. Hardened pieces of the adhered material periodically break free, leaving an irregularly shaped depression along the cutting edge. This causes damage to the part and insert. Cutting forces also will be increased due to built-up edge.

CAUSE	SOLUTION
Speed	Increase cutting speed.
Feed	Increase feed.
Coolant	Use mist or flood coolant to avoid chips sticking to the insert when machining stainless steel and aluminum alloys.
Edge-Prep	Use sharper edge, positive rake PVD insert; use polished inserts for non-ferrous materials.

Thermal Cracks

These cracks run perpendicular to the insert's cutting edge and are caused by the extreme temperature variations.

These temperature variations create heat stresses in the insert, which can result in thermal cracks. To the untrained eye, advanced thermal cracking could appear as chipping.

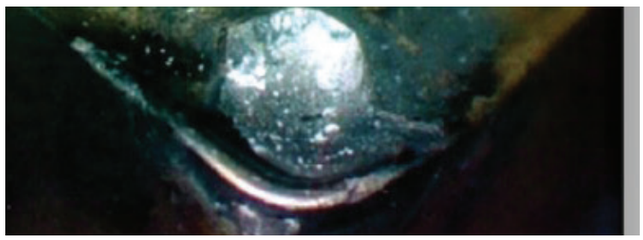


CAUSE	SOLUTION
Grade	Use coated grade.
Speed & Feed	Reduce speed and possibly the feed.
Coolant	Shut off coolant.

Crater Wear

A relatively smooth, regular depression is produced on the insert's rake face. Carter wear occurs in two ways:

1. Material adhering to the insert's top surface is dislodged, carrying away minute fragments of the top surface of the insert.
2. Frictional heat builds up from the flow of chips over the top surface of the inert. Eventually, this heat buildup softens the insert behind the cutting edge and removes the minute particles of the insert until a crater forms.



CAUSE	SOLUTION
Grade	Use a more wear-resistant grade.
Speed	Reduce cutting speed.
Edge-Prep	Use smaller T-land or increase feed to proper range for T-land.

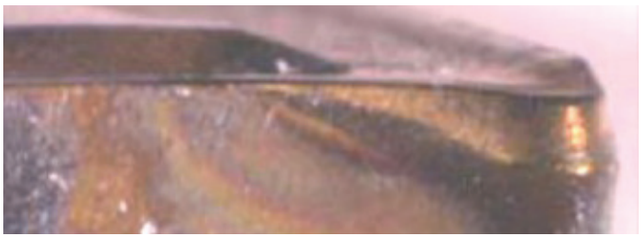
Flank Wear

Uniform flank wear is the preferred method of insert failure because it can be predicted. Excessive flank wear increases cutting forces and contributes to poor surface finish. NOTE: Inserts should be indexed when roughing (.38mm-.50mm flank wear is reached) and finishing (.25mm-.38mm flank wear or sooner).

CAUSE	SOLUTION
Grade	Use more wear-resistant grade. Change to a coated grade if you are now using an uncoated grade.
Grade	Inspect insert to determine if proper style is being used.
Speed	Speed should be reduced without changing feed.
Feed	Increase feed.

Multiple Factors

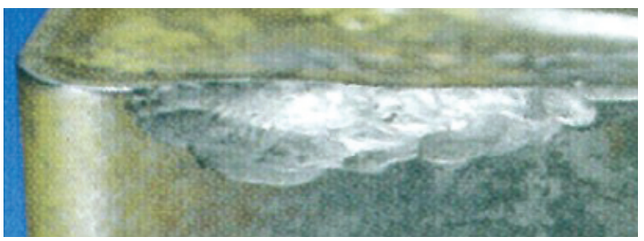
When wear, chipping, thermal cracking, and breakage occur at once, the machine operator must look behind the normal feed, speed, and depth-of-cut adjustments to find the root cause of the problem.



CAUSE	SOLUTION
Feed	Reduce feed rate to relieve cutting forces.
Insert/Grade	If possible, use a larger nose radius. Use T-land insert. Use a tougher grade of carbide.

Chipping

Appears like normal flank wear to the untrained eye. Actually, normal flank wear lands have a fine, smooth wear pattern, while a land formed by chipping has a saw-toothed, uneven surface. If chipping is not detected soon enough, it may be perceived as depth-of-cut notching.



CAUSE	SOLUTION
Grade	Use a tougher grade.
Edge Prep	Use larger hone or T-land possible.
Built-Up Edge	Increase speed.
Chatter	Check system rigidity for proper part clamping. Correct worn gibs/bearings. Check for improper tool mounting.
Feed	Reduce feed.
Recutting Chips	Use air blast or coolant to remove chips.

Recommended Cutting Speed Ratings

Low-Carbon (<0.3% C) and Free-Machining Steel — speed — m/min (SFM) — Starting Conditions ◁▷

material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P0/P1	WP05CT							◁▷			435	1450
	WP15CT							◁▷			395	1320
	WP25CT				◁▷						275	925
	WP35CT			◁▷							210	700
	WS10PT/WU10PT				◁▷						280	925

Medium- and High-Carbon Steels (>0.3% C) — speed — m/min (SFM) — Starting Conditions ◁▷

material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P2	WP05CT				◁▷						240	800
	WP15CT				◁▷						265	880
	WP25CT			◁▷							195	650
	WP35CT		◁▷								150	500
	WS10PT/WU10PT			◁▷							200	650

Alloy Steels and Tool Steels (≤330 HB) (≤35 HRC) — speed — m/min (SFM) — Starting Conditions ◁▷

material group	grade	135 (450)	180 (600)	225 (800)	275 (900)	320 (1050)	360 (1200)	410 (1350)	455 (1500)	495 (1650)	m/min	SFM
P3	WP05CT			◁▷							205	680
	WP15CT			◁▷							190	630
	WP25CT		◁▷								155	510
	WP35CT	◁▷									120	400
	WS10PT/WU10PT		◁▷								155	510

Alloy Steels and Tool Steels (340–450 HB) (36–48 HRC) — speed — m/min (SFM) — Starting Conditions ◁▷

material group	grade	60 (200)	90 (300)	120 (400)	150 (500)	180 (600)	210 (700)	240 (800)	270 (900)	300 (1000)	m/min	SFM
P4	WP05CT				◁▷						160	530
	WP15CT				◁▷						145	480
	WP25CT			◁▷							105	360
	WP35CT		◁▷								95	325
	WS10PT/WU10PT			◁▷							110	360

Ferritic, Martensitic, and PH Stainless Steels (≤330 HB) (≤35 HRC) — speed — m/min (SFM) — Starting Conditions ◁▷

material group	grade	120 (400)	150 (500)	180 (600)	210 (700)	240 (800)	270 (900)	300 (1000)	330 (1100)	360 (1200)	m/min	SFM
P5	WP05CT					◁▷					240	800
	WP15CT					◁▷					215	720
	WP25CT				◁▷						195	650
	WP35CT			◁▷							135	450
	WS10PT/WU10PT				◁▷						200	660

Ferritic, Martensitic, and PH Stainless Steels (340–450 HB) (36–48 HRC) — speed — m/min (SFM) — Starting Conditions ◁▷

material group	grade	105 (350)	135 (450)	165 (550)	195 (650)	225 (750)	255 (850)	285 (950)	315 (1050)	345 (1150)	m/min	SFM
P6	WP05CT				◁▷						200	660
	WP15CT				◁▷						180	600
	WP25CT			◁▷							150	500
	WP35CT	◁▷									105	350
	WS10PT/WU10PT			◁▷							150	500

Austenitic Stainless Steel — speed — m/min (SFM)

material group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	Starting Conditions m/min	Starting Conditions SFM
M1	WM15CT			◁▷							180	600
	WM25CT			◁▷							150	500
	WM35CT		◁▷								120	400
	WS10PT				◁▷						215	700
	WS25PT			◁▷							180	550

Austenitic Stainless Steel — speed — m/min (SFM)

material group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	Starting Conditions m/min	Starting Conditions SFM
M2	WM15CT			◁▷							165	550
	WM25CT		◁▷								140	450
	WM35CT		◁▷								105	350
	WS10PT				◁▷						200	650
	WS25PT			◁▷							165	500

Austenitic Stainless Steel: Duplex (Ferritic and Austenitic Mixture) — speed — m/min (SFM)

material group	grade	90 (300)	135 (450)	180 (600)	225 (800)	270 (900)	315 (1050)	360 (1200)	405 (1350)	450 (1500)	Starting Conditions m/min	Starting Conditions SFM
M3	WM15CT			◁▷							150	500
	WM25CT		◁▷								120	400
	WM35CT		◁▷								90	300
	WS10PT			◁▷							185	600
	WS10PT/WU25PT			◁▷							150	450

Grey Cast Iron — speed — m/min (SFM)

material group	grade	60 (200)	180 (600)	305 (1000)	430 (1400)	550 (1800)	675 (2200)	800 (2600)	920 (3000)	1040 (3400)	1160 (3800)	Starting Conditions m/min	Starting Conditions SFM
K1	WK05CT				◁▷							450	1500
	WK15CT				◁▷							360	1200
	WK20CT				◁▷							300	1000

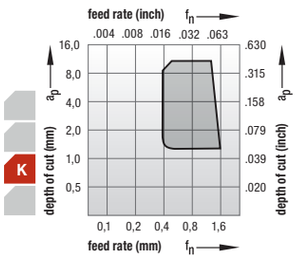
Ductile, Compacted Graphite, and Malleable Cast Irons (<600 MPa tensile strength) — speed — m/min (SFM)

material group	grade	90 (300)	135 (450)	180 (600)	225 (750)	275 (900)	320 (1050)	360 (1200)	410 (1350)	460 (1500)	500 (1650)	Starting Conditions m/min	Starting Conditions SFM
K2	WS10PT				◁▷							200	650
	WK05CT							◁▷				360	1200
	WK15CT					◁▷						270	900
	WK20CT					◁▷						240	800

Ductile, Malleable, and Austempered Cast Irons (>600 MPa tensile strength) — speed — m/min (SFM)

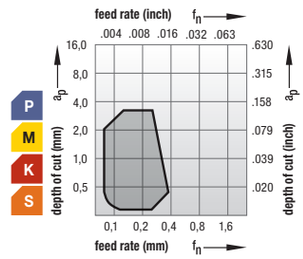
material group	grade	90 (300)	135 (450)	180 (600)	225 (750)	275 (900)	320 (1050)	360 (1200)	410 (1350)	460 (1500)	500 (1650)	Starting Conditions m/min	Starting Conditions SFM
K3	WS10PT/WU10PT			◁▷								150	500
	WK05CT				◁▷							240	800
	WK15CT				◁▷							215	725
	WK20CT				◁▷							210	700

Negative Inserts



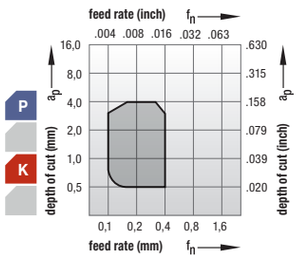
..MA

Flat top geometry for machining cast iron. For finishing to roughing applications.



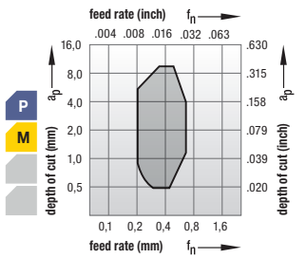
FF

For finish turning, producing smooth, accurate surfaces. Very good chip control, especially at low depths of cut.



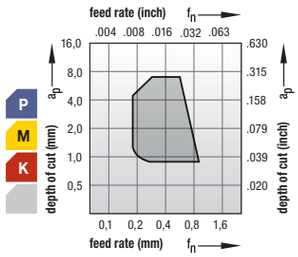
ML

For finishing to medium machining with a negative, stable cutting edge.



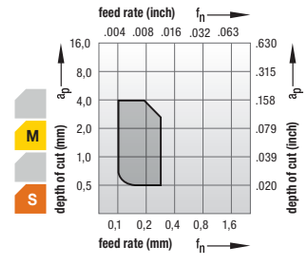
MR

For medium to light roughing of steels, difficult-to-machine high-alloy titanium, and aluminum materials. High strength to deal with heavy chip deformation.



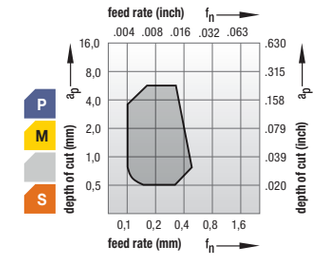
RH

For medium-duty to roughing. Outstanding chip control. High edge strength for interrupted cuts, forging skin, or scale. Preferred for all cast iron, such as gray, malleable, and nodular.



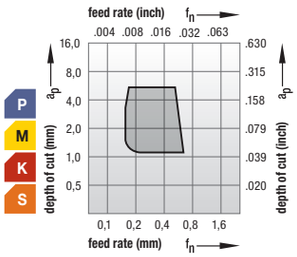
UF

For finishing with a positive cutting edge for reduced cutting forces and superior surface quality.



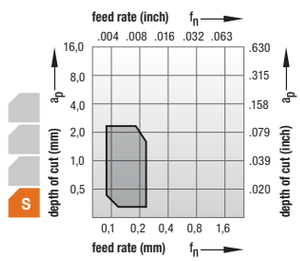
UM

For medium-duty turning operations. Soft-cutting chipbreaker. Used in applications producing varying chip sections, such as profile or copy turning. Good dimensional accuracy. For soft steel materials and stainless steels.



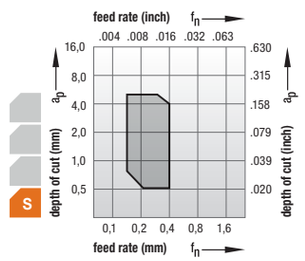
UR

Roughing geometry with smooth chip forming and improved coolant flow for increased tool life. Positive geometry reduces cutting forces and improves depth-of-cut notching resistance. Ideally suitable for stainless steel applications and for smooth machining of steel.



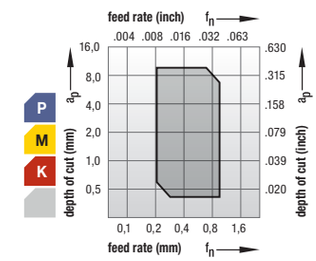
FS

For finishing applications. Ground periphery with positive cutting edge ideally suited for high temp alloys Micro finished edge on the ground periphery adds just a slight hone for improved edge integrity and reliability.



MS

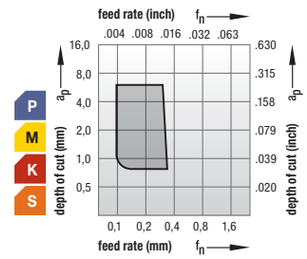
For medium machining in high-temp materials. Utilizes a micro-finished edge preparation to increase edge toughness.



-RU

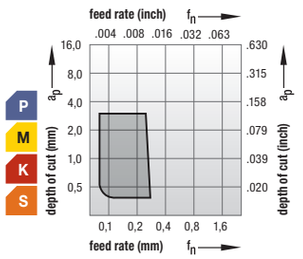
Positive geometry for smooth cutting. Positive T-land with rake angle to lower cutting forces and improve DOCN resistance. Post-coat grinding of seating surface for secure seating surface. Good edge strength for interrupted cuts, forging skin, and casting surfaces.

Positive Inserts



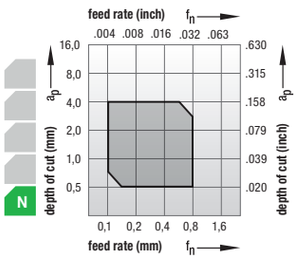
MP

For medium to rough turning with reduced cutting forces and improved chip control for high feed rates. Suitable for high metal removal rates and spindling applications.



FP

For finishing to medium turning operations with optimal chip control over a wide range of cutting conditions and workpiece materials.



-AL

For cost-effective machining of aluminum, non-ferrous metals and plastics. Extremely sharp cutting edges result in optimum part finishes with low cutting forces and short chips.

ISO TURNING

ALL-STAR FOCUSED EDITION

WIDIA™